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National Labs

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New Mexico Small Business Assistance Program Pairs Inventors with National Labs

Lithified Technologies looks to nature for solutions to crumbling roads and uncapped uranium mines.

In its trademarked LithTec system, the 10-year-old Santa Fe company uses technology to mimic lithification — a natural process by which soil transforms into stone and clay into slate — to tackle road deterioration from the ground up.

To refine and test its trademarked soil technology product LithTech, which it calls “nature’s concrete,” Lithified Technologies, CEO Bob Sherwin requested technical assistance through the New Mexico Small Business Assistance (NMSBA) program from Los Alamos National Laboratory in 2019 to test the technology under strenuous conditions. In 2020, the company partnered with business on the Navajo Nation to evaluate the technology as resilient covers for the hundreds of abandoned uranium mines on the Navajo Nation. .

NMSBA provides New Mexico small businesses facing technical challenges access to the unique expertise and capabilities of Los Alamos and Sandia national laboratories. At no cost to the business, small businesses can seek assistance from lab scientists and engineers to solve challenges and overcome barriers to company success..

Businesses can apply to the individual program year-round. But applications for leveraged projects, which allow multiple businesses with common technical challenges to obtain assistance collectively, are accepted twice a year. The second proposal process for 2021 leveraged projects closes February 16.

Funding ranges from \$40,000 to \$120,000. The money represents the value of work performed by the labs on behalf of the project; it’s not a cash award.

CEO Bob Sherwin incorporated Lithified Technologies to pursue his idea that the soil-to-rock process could be accelerated using a specific mix of materials that would strengthen and prolong the lives of America’s roads, which fail because of water permeation and the ever-increasing weight of semitractor trailers.

Seven years of research and development yielded a proprietary blend of road-base materials that enable a shallower surface layer of asphalt and thus a 60 percent reduction of a project’s cost. “Roads wear from the top,” Sherwin said. “We approach them from the bottom up.”

Sherwin worked with Gilles Bussod, a scientist in the Earth System Observation Group at Los Alamos National Laboratory, to test the technology under strenuous conditions that might have otherwise taken decades.

Once that problem was solved, Sherwin researched whether LithTec could be used to build more resilient covers for the hundreds of abandoned uranium mines on the Navajo Nation that are leaking contaminants into reservation waters. “This is a massive problem and a tremendous opportunity for us to make a difference in trying to clean up some of these sites and the water for all the people living around them,” he said.

Previous mine caps were constructed of thick layers of clay and concrete or alternating layers of clay and sand. All failed over time.

In 2020, Sherwin applied for a leveraged NMSBA project on behalf of his company, the Navajo Nation, investors, and others who would benefit if the uranium capping technology proved sound and again was paired with Bussod.

Los Alamos' experience with uranium containment dating back to the Manhattan Project made it the perfect partner, Sherwin said. "With only two labs in the country that can measure uranium containment, and Los Alamos being No. 1, we went to them to help us with measuring and testing and coming up with all the data necessary to substantiate the efficacy of this design."

"We obtained some really positive results," Bussod said. "From that we have completed a design for capping uranium mines that's unique and also durable."

Sherwin, Bussod and Navajo Nation leaders plan to present their findings to the U.S. Nuclear Regulatory Commission to persuade the agency to use LithTec-based caps in mine remediation projects.

Both the road-building and mine-capping projects are multibillion-dollar enterprises, Sherwin said. "We are ready to roll and have between \$20 and \$30 million [in new business] in the pipeline for 2021."

Businesses interested in getting technical help on cutting-edge products can apply for funding at <https://www.nmsbaprogram.org/>.